WHAT IS CLAIMED IS:

1. A method for reconstructing a three-dimensional image of a region of interest of an object disposed within an object region from cone beam projection data, the method comprising the steps of:

a) acquiring the cone beam projection data, the cone beam projection data comprising a plurality of cone beam projection images;

b) identifying a region of interest within each of two projection images;

c) projecting each identified region of interest through at least a portion of the object region to identify a three-dimensional reconstruction region defined by a plurality of points; and

d) reconstructing the image at each of the plurality of points to form the three-dimensional image of the region of interest.

2. The method of Claim 1 wherein the cone beam projection data is acquired by operating a source and a detector arrangement at a plurality of source positions along a scan path that encircles the region of interest of the object.

3. The method of Claim 1, wherein the cone beam projection images are acquired by a computed tomography (CT) system comprising an x-ray source and a detector, the cone beam projection data being acquired by:

projecting x-rays from the x-ray source through the object; and

using the detector to detect the x-rays passing through the object, the detector comprising a plurality of pixels, each pixel having an intensity value associated therewith, the detector generating projection data in response to the x-rays impinging thereon, the projection data corresponding to the intensity values.

4. The method of Claim 1, wherein a source and detector arrangement rotate about an axis of rotation and the projection images are acquired at angular

increments about the axis of rotation, the step of identifying the first and second regions of interest comprises the steps of:

selecting the first projection image at a predetermined angle; and

selecting the second projection image at an angle ninety degrees beyond the predetermined angle.

5. The method of Claim 1, further comprising the step of displaying the three-dimensional image of the region of interest.

6. The method of Claim 1, wherein the plurality of points form a three-dimensional lattice of points.

7. A method for reconstructing a three-dimensional image of a region of interest of an object from cone beam projection data, the method comprising the steps of:

a) acquiring the cone beam projection data, the cone beam projection data comprising a plurality of cone beam projection images;

b) identifying a region of interest within a plurality of projection images;

c) projecting each identified region of interest to a source position corresponding with the associated projection image to define a three-dimensional projected cone;

d) sampling the intersection of the projected cones to determine a three-dimensional reconstruction region defined by a plurality of points; and

e) reconstructing the region of interest at each of the plurality of points to form the three-dimensional image of the region of interest.

8. The method of Claim 7, wherein the step of identifying a region of interest comprises the step of identifying regions of interest with two cone projection images disposed at ninety degrees from each other.

9. The method of Claim 7, wherein the cone beam projection data is acquired by operating a source and a detector arrangement at a plurality of source positions along a scan path that encircles the region of interest of the object.

10. The method of Claim 7, further comprising the step of displaying the three-dimensional image of the region of interest.

11. The method of Claim 7, wherein the plurality of points form a three-dimensional lattice of points.

12. A method for reconstructing a three-dimensional image of a region of interest of an object disposed within an object region from cone beam projection data, the method comprising the steps of:

a) acquiring the cone beam projection data, the cone beam projection data comprising a plurality of cone beam projection images;

b) identifying a region of interest within one of the plurality of projection images;

c) projecting the identified region of interest through at least a portion of the object region to define a three-dimensional reconstruction region defined by a plurality of points; and

d) reconstructing the region of interest at each of the plurality of points to form the three-dimensional image of the region of interest.

13. The method of Claim 12, wherein the cone beam projection data is acquired by operating a source and a detector arrangement at a plurality of source positions along a scan path that encircles the region of interest of the object.

14. The method of Claim 12, further comprising the step of displaying the three-dimensional image of the region of interest.

15. The method of Claim 12, wherein the plurality of points form a three-dimensional lattice of points.

16. A method for reconstructing a three-dimensional image of a region of interest of an object from cone beam projection data, the method comprising the steps of:

a) acquiring the cone beam projection data, the cone beam projection data comprising a plurality of cone beam projection images;

b) identifying a region of interest within a first one of the plurality of projection images;

c) projecting the identified region of interest to a source position corresponding with the first one of the plurality of projection images to define a first three-dimensional projection cone;

d) projecting a second one of the plurality of projection images to a source position corresponding with the second one of the plurality of projection images to define a second three-dimensional projection cone;

e) using the first and second projected cones to determine a three-dimensional reconstruction region defined by a plurality of points; and

f) reconstructing the region of interest at each of the plurality of points to form the three-dimensional image of the region of interest.

17. The method of Claim 16, wherein the cone beam projection data is acquired by operating a source and a detector arrangement at a plurality of source positions along a scan path that encircles the region of interest of the object.

18. The method of Claim 16, further comprising the step of displaying the three-dimensional image of the region of interest.

19. The method of Claim 16, wherein the plurality of points form a three-dimensional lattice of points.

20. A system for reconstructing a three-dimensional image of a region of interest of an object disposed within an object region from cone beam projection data, comprising:

a) means for acquiring the cone beam projection data, the cone beam projection data comprising a plurality of cone beam projection images;

b) means for identifying a region of interest within each of two projection images;

c) means for projecting each identified region of interest through at least a portion of the object region to identify a three-dimensional reconstruction region defined by a three-dimensional lattice of points; and

d) means for reconstructing the image at each point in the three-dimensional lattice of points.

21. The system of Claim 20, wherein the means for acquiring the cone beam projection data comprises a source and a detector arrangement operable at a plurality of source positions along a scan path that encircles the region of interest of the object.

22. The system of Claim 20, wherein the means for acquiring cone beam projection data comprises a computed tomography (CT) system, the CT system including a x-ray source and a detector, the x-ray source projecting x-rays through the object, the detector detecting x-rays that pass through the object, the detector comprising a plurality of pixels, each pixel having an intensity value

associated therewith, the detector generating projection data in response to the x-rays impinging thereon, the projection data corresponding to the intensity values.

23. The system of Claim 20, further comprising a display for displaying the three-dimensional image of the region of interest.

24. A system for reconstructing a three-dimensional image of a region of interest of an object from cone beam projection data, comprising:

a) means for acquiring the cone beam projection data, the cone beam projection data comprising a plurality of cone beam projection images;

b) means for identifying a region of interest within a plurality of projection images, respectively;

c) means for projecting each identified region of interest to a source position corresponding with the associated projection image to define a three-dimensional projected cone;

d) means for sampling the intersection of the projected cones to determine a three-dimensional reconstruction region defined by a plurality of points; and

e) means for reconstructing the region of interest at each of the plurality of points to form the three-dimensional image of the region of interest.

25. A system for reconstructing a three-dimensional image of a region of interest of an object disposed within an object region from cone beam projection data, comprising:

a) means for acquiring the cone beam projection data, the cone beam projection data comprising a plurality of cone beam projection images;

b) means for identifying a region of interest within one of the plurality of projection images;

c) means for projecting the identified region of interest through the object region to define a three-dimensional reconstruction region defined by a plurality of points; and

d) means for reconstructing the region of interest at each of the plurality of points to form the three-dimensional image of the region of interest.

26. A system for reconstructing a three-dimensional image of a region of interest of an object from cone beam projection data, comprising:

a) means for acquiring the cone beam projection data, the cone beam projection data comprising a plurality of cone beam projection images;

b) means for identifying a region of interest within a first one of the plurality of projection images;

c) means for projecting the identified region of interest to a source position corresponding with the first one of the plurality of projection images to define a first three-dimensional projection cone;

d) means for projecting a second one of the plurality of projection images to a source position corresponding with the second one of the plurality of projection images to define a second three-dimensional projection cone;

e) means for using the first and second projected cones to determine a three-dimensional reconstruction region defined by a plurality of points; and

f) means for reconstructing the region of interest at each of the plurality of points to form the three-dimensional image of the region of interest.

27. A computer storage product having at least one computer storage medium having instructions stored therein causing one or more computers to perform the method of Claim 1.

28. A method for reconstructing a three-dimensional image of a region of interest of an object disposed within an object region from cone beam projection data, the method comprising the steps of:

a) acquiring the cone beam projection data, the cone beam projection data comprising a plurality of cone beam projection images;

b) identifying a region of interest within a first one of the plurality of projection images;

c) projecting the region of interest identified within the first one of the plurality of projection images to a source position corresponding with the first one of the plurality of projection images to define a first three-dimensional projection cone;

d) defining a second three-dimensional volume;

e) using the first three-dimensional projection cone and the second three-dimensional volume to identify a three-dimensional reconstruction region defined by a plurality of points; and

f) reconstructing the region of interest at each of the plurality of points to form the three-dimensional image of the region of interest.

29. The method of Claim 28 wherein the second three-dimensional volume is a second three-dimensional projection cone, and the step of defining the second three-dimensional volume is accomplished by the steps of:

identifying the region of interest within a second one of the plurality of projection images; and

projecting the region of interest identified within the second one of the plurality of projection images to a source position corresponding with the second one of the plurality of projection images to define the second three-dimensional projection cone.

30. The method of Claim 28 wherein the second three-dimensional volume is the object region and the step of defining the second three-dimensional volume is accomplished by the step of defining the object region.

31. The method of Claim 28 wherein the step of defining the second three-dimensional volume is accomplished by the step of projecting a second one of the plurality of projection images to a source position corresponding with the second one of the plurality of projection images to define the second three-dimensional volume.